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INTERNATIONAL BULLETIN
OF PLANT PROTECTION

Year XX May & June 1946 Nos. 5 & 6

PEACH-TREE DECAY IN NORTH ITALY WITH PHLOEM NECROSIS AND DEGENERATION OF THE CAMBIUM *

Phenomena of peach-tree decay have appeared for the last 7 or 8 years in Venezia Giulia (Udine and Trieste Provinces) and, in 1940-41, in some zones they were particularly severe in character owing to the high mortality percentage they caused. In the experiment orchard belonging to the agricultural Inspectorate, out of thousands of peach-trees planted 8 years ago and which in the spring of 1940 were in excellent condition, approximately 80 per cent. during growth that year showed a more or less marked decay, and in the following spring over 300 trees were dead. This mortality rose still higher in 1941 and decay spread to practically all the trees which had remained sound the previous year.

Always in 1940, a similar decay was reported showing characteristics of equal seriousness in many other centres scattered throughout a zone which may be delimited by a triangle having as base the territory surrounding the town of Udine, then descending to the Adriatic coast level with Monfalcone. Everywhere the disease apparently spread around the initial centres of outbreak.

Except in the case already cited of the Udine experiment orchard, in the years following 1940, up to the spring of 1943 — period when investigations were interrupted owing to unforseen circumstances — the rate of the spread of the disorder was rather slow and its course had a tendency to the chronic state although cases of apoplectic aspect like those found in 1940 were not wanting.

Mostly 8 to 10 year old trees were affected, although younger peach-trees, even only 3 years old, contracted the disease.

It seems that all the peach varieties cultivated are susceptible. Up to the present, this decay has been definitely found on ' Early Rose ', ' Alton ', ' Admiral Dewey ', ' Carman ', ' Bella di Roma precoce ', ' Waddel ', ' Early Elberta ', ' Hale ', ' Henriette tardive ', ' Alexander ' and ' Uneda '.

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* Communication from Prof. GABRIELE GOIDÀNICH, Station of Plant Pathology, Rome, Italy.

No definite relation has been established between specific environmental growth conditions and the appearance of the disease. The disease attacked trees cultivated in peach-growing zones and where, however, perfectly sound healthy orchards were observed. Touching these orchards were others where the disease was widespread among peach-trees of the same variety, the same age, raised by the same system and given the same cultivation care. It also appears that the influence, at least direct, of exceptional meteorological conditions is to be excluded.

External characteristics of the disease.

The leaves first lose their normal colour, turning a pale shade with marked red hues, especially frequent along the edges and the nervures. These leaves subsequently fold over in the form of a tube, the two edges of the limb turning upwards and nearly always showing distinct swellings. The vegetation is on the whole thinner concentrating towards the top, forming at the extremity of each branch rosettes or witch-brooms.

During the spring no pathological symptom is noted on the external surface of the bark ; only later are cracks and depressions from which a gummy liquid may ooze, produced. In an advanced stage of growth, sudden withering of always the largest branches occurs ; in cases in the acute phase, before the beginning of summer, the entire foliage is jeopardized. The tree generally dies off during the summer.

Internal characteristics of the disease.

The most marked characteristic is the rust colour and subsequently a browning acquired by the tissues of the median part of the phloem (see fig. 1) which may be found more or less spread along the different parts of the tree according to the seriousness and age of the disease (see fig. 2). It is distinctly visible also in one-year old branches and it stops in the trunk at the level of grafting.

In the more advanced stages of the disease, the disorder affects the entire thickness of the phloem, from the oldest cells to those formed last and arrives up to the cambium ; from there it penetrates into the wood.

Anatomy of the diseased tissues.

The pathological phenomenon which is continually observed in the microscopic examination of diseased peach-trees is a more or less profound degeneration of the cambial meristem, and at the same time a morphological modification of the different elements which constitute the phloem system, followed up by an ensemble of disorganization processes with chromatic manifestations easily visible and localized chiefly in the median part and affecting practically two thirds of the thickness of the phloem.

Internal characteristics of the disease

Fig. 1. — Detail of a peach-tree branch on which growth anomalies already showed. On making a cut in the phloem cortical system, the pathological characteristics of the median part of the phloem were displayed. S: bark, F: old normal phloem tissue, A: median zone of the cankered phloem, J: young unchanged phloem tissue, C: cambial meristem, L: wood.

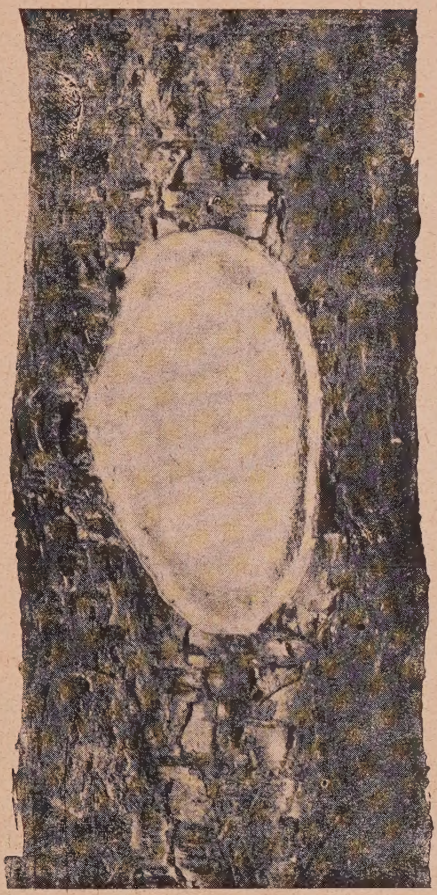

Fig. 2 — Branch of 2-year old peach-tree from which the cortical tissue has been removed in order to show the phloem. In this case, the disorder is more marked in the right part of the figure.

Anatomy of the diseased tissues

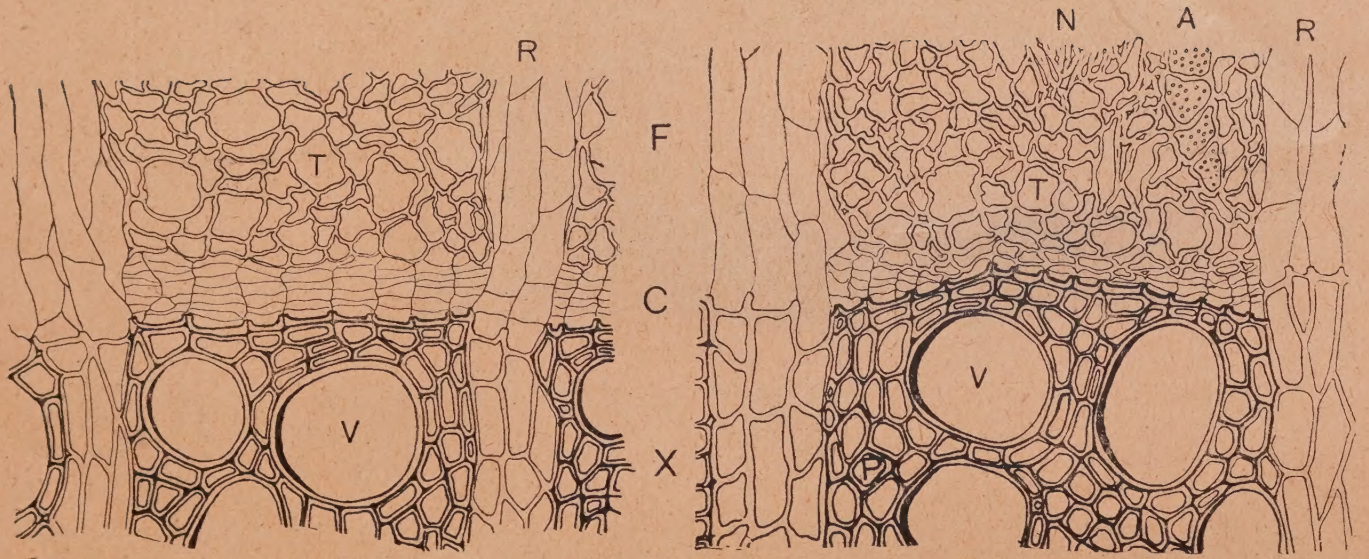

Fig. 3. — Microscopic aspect of a section cut through the productive zone of a peach-tree branch, healthy (left) and diseased (right), of the same age and the same variety. The degeneration of the cambial meristem is evident in the diseased peach-tree. C: cambium, F: phloem, X: xylem, R: medullary ray, T: sieve tube, V: xylem vessel, P: wood parenchyma, N: onset of canker in cells of the phloem tissue, A: cells of the phloem parenchyma rich in starch.

These disorganization processes consist in a progressive swelling of the walls which lead to an obliteration of the lumen and their successive gummification which makes them become a shapeless cellular mass (see fig. 3); that is to say, it is a true canker process. This canker is more or less marked and more or less extended according to the size and age of the organ examined, the time of the year when observations are made and especially according to when the disease started. Finally, it is seen that, other conditions being equal, the degree of change may vary from one point to another in the same section, so that at the side of sections where the canker has reached the maximum intensity, may be found others which present all the intermediary degrees of deterioration up to practically complete histological normality.

The character of the disturbance in cambium activity, on the contrary, is more constant and more uniform.

The changes in the woody tissues, chronologically posterior to those of the phloem, are less important and consist, on the whole, of manifestations of gummy degeneration which affects indiscriminately the parenchyma, accessory cells, fibres, though not the medullary rays.

Cultural examination of the deteriorated tissues.

The cultural examination of degenerated tissues has always given a negative result. The appearance of saprophytic micro-organisms was only noted sporadically with tissues which have been long and greatly changed, and which were not protected by cicatrization meristems.

* * *

It is evident, therefore, that decay connected with phloem necroses is not due to parasitic causes.

As already stated, the action, at least that direct, of cold is to be excluded; the effects of frost produce histological phenomena much different from those described. Account, however, should be taken of slight thermic variations which occurred at a period relatively very close before the appearance of pathological symptoms, passed unnoticed on ordinary examination. Correlations between similar climatic anomalies and histological changes similar to those in peach-trees in North Italy have been described in recent works (Gard 1932, Biraghi 1941). Nonetheless, it should not be forgotten, in accepting this hypothesis, that slight or moderate cold, with immediate or delayed action, causes irregularities in the differentiation and distribution of tissues which, in general, follow the eventual appearance of a canker process and not *viceversa* as in the case in question.

The disease of peach-trees in Venezia Giulia presents great similarities both in its external manifestation and in its internal characteristics, with that long known on other fruit trees (plum, cherry, apricot) in different regions of North Italy and which is called ' non-parasitic leptonecrosis ' (Goidànich 1934, 1936, 1937; Peyronel 1936; Lindegg 1937) and for the aetiology of

which different hypotheses had been made, the most likely being that it was a case of virus disease. ' Non-parasitic leptonecrosis ' almost certainly exists in France in the Rhône Valley where it has been described by CHABROLIN (1924) on the apricot ; very probably it is found in other zones of Central East Europe (SCHILBERSZKY 1932-33 ; SAREJANNI 1937 ; STAEHELIN 1943*).

Symptomatic and aetiological analogies with the peach disease we have just described, are found in the disease, also of the peach, described by CIFERRI in the Piedmont under the name of ' rosetta nutrizionale ' (1938), in the decay of pear and apple trees studied by PETRI in Alto Adige (1936) and lastly in the disease described by PESANTE, which attacks the olive in Central and Southern Italy (1938), and encountered by BENLLOCH in Spain (1944).

From all these observations it is evident that the decay of fruit trees connected with degeneration of the cambial meristem and canker of the phloem are very widespread and constitute a phytopathological problem of great importance and which merits the attention of scientists.

* *In litt.*

THE APPEARANCE AND ADVANCE OF THE COLORADO BEETLE (*LEPTINOTARSA DECEMLINEATA*) IN SWITZERLAND AND IN LIECHTENSTEIN IN 1945 *

In 1945 the Colorado beetle invasion spread to an unprecedent extent. This beetle invaded practically the entire territory of Switzerland. Besides the Mendrisiotto and the South East region of the Andeer-Surava-Jenaz line in the canton of Graubünden, only a few Alpine valleys escaped. The attack generally showed a decrease in intensity from West to East. A very severe infestation was reported in the following localities : Bernese lakes region to the south-west of the Biel-Lyss line, including the river communes of the Saane, the Aare Valley below Thun, Basel-Stadt canton, the district of Arlesheim and the lower-lying communes of the Thierstein, Dorneck, Liestal and Rheinfelden districts. The neighbouring regions should also be considered as being severely infested : Bödeli (Interlaken), the Aare Valley up towards Olten (including all Mittelland and the lateral valleys of the Gürbe, Emme up to

* Communication from the Federal Establishment for Agricultural Experiments, Zurich-Oerlikon, Switzerland.

beyond Bourgdorf, the Wigger up to Reiden and the Dünnern), some parts of the Thierstein, Dorneck, Liestal, Sissach and Rheinfelden districts, the Wakwilermoos, the Bünz Valley below Huri and the communes situated near the mouth of the Aare. The remainder of the country was only slightly infested with only a few sporadic foci in proportion to the increase in altitude. In east Switzerland in places there is an accumulation of massed foci, for example in some communes of the Schaffhaussen canton, in the Diessenhofen and Frauenfeld districts of the Thurgau canton, in the districts of Bülach and Dielsdorf (Zurich canton), March and Küssnacht (Schwyz canton) and lastly in the canton of St. Gallen (Linth region, valley of the Seez and the Rhine).

The first adult insects were reported on March 15 at Aesch and on March 29 at Oberwil (Basel-Land canton) ; during April they were observed in many localities. Towards the end of the month the Colorado beetle had been seen in considerable numbers, particularly in the region of the north-western frontier. In May the beetle was reported in all parts of the country, especially in the regions of east Switzerland as well as in many localities at a high altitude where, until then, the adults did not appear before June. The main invasion took place in June and at the beginning of July (June 1-15 in the low-lying localities of western and north-western Switzerland, June 15-30 and beginning of July in central and eastern Switzerland).

Despite the favourable conditions for the development of the insect, a second generation did not occur to the extent thought probable. After July 1 many adults of the summer generation were found, but further increase did not take place anywhere. Towards the end of July and in August, the parasite everywhere was in progressive decline. This undoubtedly to a large extent is due to the large-scale control measures employed, but, on the other hand, the hot dry weather appears to have induced the beetle to bury into the ground earlier than usual. The October and November reports show that numerous adults have been brought to the surface during potato harvesting and ploughing operations, an indication that the parasite is hibernating in large numbers in the soil.

The following table indicates the cantons and communes infested and the number of foci in 1944 and 1945 :—

CANTONS	Communes infested			Foci	
	Number 1945	% 1945	% 1944	1945	1944
Zürich	171	100	70	4288	1004
Bern	316	100	62	not definitely established	6982
Luzern	105	99	28	1949	137
Uri	9	45	20	not definitely established	17
Schwyz	23	77	30	1392	71
Obwalden	7	100	71	327	31
Nidwalden	11	100	55	70	13
Glarus	21	72	14	about 140	7
Zug	11	100	100	527	120
Basel-Stadt	3	100	100	widespread invasion	widespread invasion
Basel-Landt	74	100	70	1023 and 33 communes with widespread invasion	1878 and 4 communes with widespread invasion
Solothurn	132	100	60	6973 and 44 communes with widespread invasion	8642
Schaffhaussen	36	100	89	1884	697
Appenzell-A.-Rh.	19	100	63	356	47
Appenzell-I.-Rh.	6	100	67	127	11
St. Gallen	90	98	80	3122 and 3 communes with widespread invasion	706
Graubünden	29	12	2	not definitely established	6
Argau	210	89	52	6135 and 11 communes with widespread invasion	2323
Thurgau	149	73	28	several communes with invasion widespread	127
Ticino	9	4	4	87	17
Liechtenstein	10	91	—	not definitely established	—

LEGISLATIVE AND ADMINISTRATIVE MEASURES

Belgium. — A Decree of the Regent, dated January 28, 1946, coming into effect on February 16, 1946, regulates as follows the sale of insecticides, fungicides, weedicides and other parasiticides :—

Art. 1. — The insecticides, fungicides, weedicides and any antiparasitic products connected with phytopharmacy intended for use in preventing and combatting the development of animals or plants injurious to agriculture, can only be sold, kept for the purpose of selling, offered for sale, transported with a view to selling or exchanged, after preliminary authorization granted by the Minister for Agriculture on the conditions he will decide for each product as it is described. Every product authorized for sale is registered by the State Phytopharmacy Division at Gembloux.

Art. 2. — The applicant will supply the aforesaid Division with :—

(1) his surname, Christian name and full address, as well as the exact location of his warehouses, plants, stores or mixing-rooms;

(2) the description and content in active substances of his product, the purpose for which it is intended, as well as the doses and method of employment.

The information is given to the Phytopharmacy Division on form A, an example of which is appended. The information in question is confidential and is kept under lock and key in the archives of the Division. The form may be sent in a sealed envelope labelled ' Phytopharmacy-Secret '.

The official list of authorized products will be published regularly in the *Moniteur belge*.

Art. 3. — The pack of the products referred to in Article 1 has to bear a sealed label. The seal must carry the name or the brand of the manufacturer (he who has attached the label).

Art. 4. — On the label should be indicated, at least in one of the national languages :

A. In every case :—

(1) the surname, Christian name and address of the manufacturer ;

(2) the exact name of the merchandise ;

(3) particular use of the product ;

(4) net contents, indicated by weight ;

(5) method of employment, otherwise it must be given with the equipment ;

(6) ultimate date of efficacy ;

(7) registration number of authorization from the testing Division .

(8) for pure products, the label will also indicate ;

(*a*) the chemical name ;

(*b*) the minimum content in active constituents.

B. In addition :—

(1) for toxic products, the existing provisions taken by the Minister of Health will have to be observed ;

(2) optional indication as to whether the product is non-poisonous or uninflammable.

Art. 5. — For products to be used in powder form, the degree of fineness must conform to the standards fixed by the testing Division. A deviation of 5 per cent. will be tolerated.

Art. 6. — It is prohibited to mention on the label names, content, particulars or guarantees other than those prescribed or authorized by this Decree.

The Minister for Agriculture authorizes or prescribes, in the cases he will decide, the use of certain qualificatives, guarantees or particulars.

Art. 7. — The guaranteed content should be expressed by one number representing the weight of the active constituents contained in 100 kilograms of the preparation.

Art. 8. — The label should carry the prescribed particulars clearly, without abbreviations, written in ink or printed ; the letters should be legible. The obligatory particulars should be given at the side of the name and address of the manufacturer.

Art. 9. — The seal is not put on when the opening of the pack is sewn together by machine ; in this case, the label or its tie has to be sewn in also.

Art. 10. — When the preparation is supplied in barrels, cans or bags, the label must be stuck onto the pack and must ensure sealing if there is no lead stamp.

Art. 11. — The label is not compulsory for sealed packs which show clearly and legibly the particulars prescribed for the label.

Art. 12. — In warehouses, mixing rooms, factories, stores, etc., the raw materials should have a card indicating their nature and bearing the inscription ' raw material '.

Art. 13. — The middleman cannot, in any case whatsoever, change or use again the original label or the original seal.

Art. 14. — The middleman who has opened an original pack, in order to sell the product, has to supply a label with his name and his seal. By this action he is considered as responsible manufacturer.

Art. 15. — Without prejudice to the prescribed provisions relative to the application of transfer taxes, the seller is required to transmit to the purchaser, within eight working days, for every delivery of a minimum value of 150 francs, an invoice or other document specifying the trade name of the product and the guarantees prescribed for the label.

Art. 16. — The invoice or document should show the particulars and guarantees such as they appear on the label ; it is prohibited to mention contents, particulars or guarantees other than those which are prescribed or authorized for the label.

Art. 17. — The deficiency of one of the constituents cannot be compensated by an excess of other ingredients.

Art. 18. — The importer, manufacturer, seller have to keep for fifteen months the invoices, a copy of the bills of sale and transport papers, so as to be able to present them when requested to the representatives of the Ministry of Agriculture.

Art. 19. — Bills and advertising (circulars, catalogues and prospectuses, except for price-lists and orders, for which only the trade name and guarantees are required) have to mention the guarantees and particulars prescribed for the label.

These documents, as also notices placed inside the pack, must not indicate particulars or guarantees other than those prescribed or authorized for the label. Details, however, may be given on the doses and method of using the product.

Art. 20. — The use of any particulars or indications capable of misleading the purchaser as regards the nature, origin, purity or use of one of the products referred to in this Decree, is prohibited under all circumstances and under any form whatsoever.

Art. 21. — The products concerned in this Decree, packed and labelled and kept in the warehouses, mixing-rooms, depots, etc. of manufacturers or sellers are considered as being held for sale.

Art. 22. — The retail seller of toxic substances is required to comply with the special prescribed provisions laid down by the Health Office in regard to the keeping and selling of these substances.

Art. 23. — For the application of this regulation, the manufacturer is to be taken as the person who puts on the market a product bearing his sealed label. By importer is meant the person who in the case of merchandise from abroad, operates the first commercial transaction in Belgium, even if only as an ordinary broker.

Art. 24. — ' Mixed ' or ' compound ' products must be homogeneous. The contents of each pack must comply with the guarantees.

Art. 25. — This regulation is not applicable to goods in transit nor to those intended for export, when consignments are accompanied by waybills in proof.

In warehouses, etc. the goods intended for export should show a clearly visible label with the words ' Product intended for export '.

Art. 26. Infractions of this regulation are rectified and verified according to the dispositions of the Royal Decree of November 30, 1939, supplementing and coordinating the regulating of the trade in seed, plants of all species, fertilizers and substances destined for stockfeed.

Art. 27. — The agents referred to in the aforesaid Royal Decree, under any circumstances and without the presence of the manufacturer or seller being required, may take samples from growers, at fairs and markets, in the factory, mixing-rooms, warehouses, depots, stations, vans or boats. Three lots of samples are taken : one is left on the spot, the other two are transmitted to the Ministry of Agriculture, which orders the second to be examined by a State laboratory or by a State agricultural station. In the case of infraction, the third sample is forwarded to the public prosecutor's office.

Art. 29. — These samples are sealed forthwith and labelled with the number of the sample, generic name of the preparation, registration number and usage, date of taking the sample and the signature of the agent who took the samples.

Art. 30. — Samples are taken :—

A. For packed mercandise :—

from all packs if not more than 3 in number, from at least 3 if their number does not exceed 5 ;

from at least 4 packs if there are from 6 to 15 ;
from at least 7 packs if there are from 16 to 30 ;
from at least 10 packs if there are from 31 to 60 ;
from at least 12 packs if they number over 60.

B. For merchandise in bulk :—

in at least 4 places in lots not exceeding 1,000 kilograms ;

in at least 6 places in lots exceeding 1,000 kilograms, but not 2,000 kilograms ;

in at least 10 places in lots exceeding 2,000 kilograms, but not 5,000 kilograms ;

in at least 15 places in lots exceeding 5,000 kilograms, but not 10,000 kilograms ;

in at least 25 places in lots exceeding 10,000 kilograms, but not 25,000 kilograms ;

in at least 40 places in lots exceeding 25,000 kilograms.

Art. 31. — When a sample is taken from a retailer, the manufacturer is notified. The sample left on the spot is placed at his disposal for his eventual defence ; it can only be destroyed after authorization by the Minister for Agriculture or his deputy.

Art. 32. — The Minister for Agriculture establishes the methods of analyses for the products coming under this regulation.

Art. 33. — The products mentioned in Article 1 which are sold, offered for sale, transported with a view to sale or exchange, without being authorized and registered by the testing Division, will be confiscated. (*Moniteur belge*, Bruxelles, 16 février 1946, 116e année, nº 47, p. 1297-1300).

Belgium. — Decree of March 19, 1945 establishes the fees for the sanitary inspection of plant products and the delivery of the requisite certificates. (*Ibid.*, 8 et 9 avril 1946, nos 98-99, p. 3326-3328).

Italy. — By Decree Law of the Lieutenancy No. 593, dated September 13, 1945, loans, exemption from certain taxes, as well as contributions and other advantages have been granted to growers and stockfarmers in the Island of Sardinia who suffered losses through locusts and drought. (*Gazzetta Ufficiale del Regno d'Italia*, Roma, 4 ottobre 1945, anno 86º, n. 119, pp. 1505-1506).

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* Assembled by GIULIO TRINCHIERI, International Institute of Agriculture.

† See this *Bulletin* 1945, Nos. 9-10, pp. 81-88; Nos. 11-12, pp. 109-112; 1946, Nos. 1-2, pp. 9-16 ; Nos. 3-4, pp. 29-31.

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